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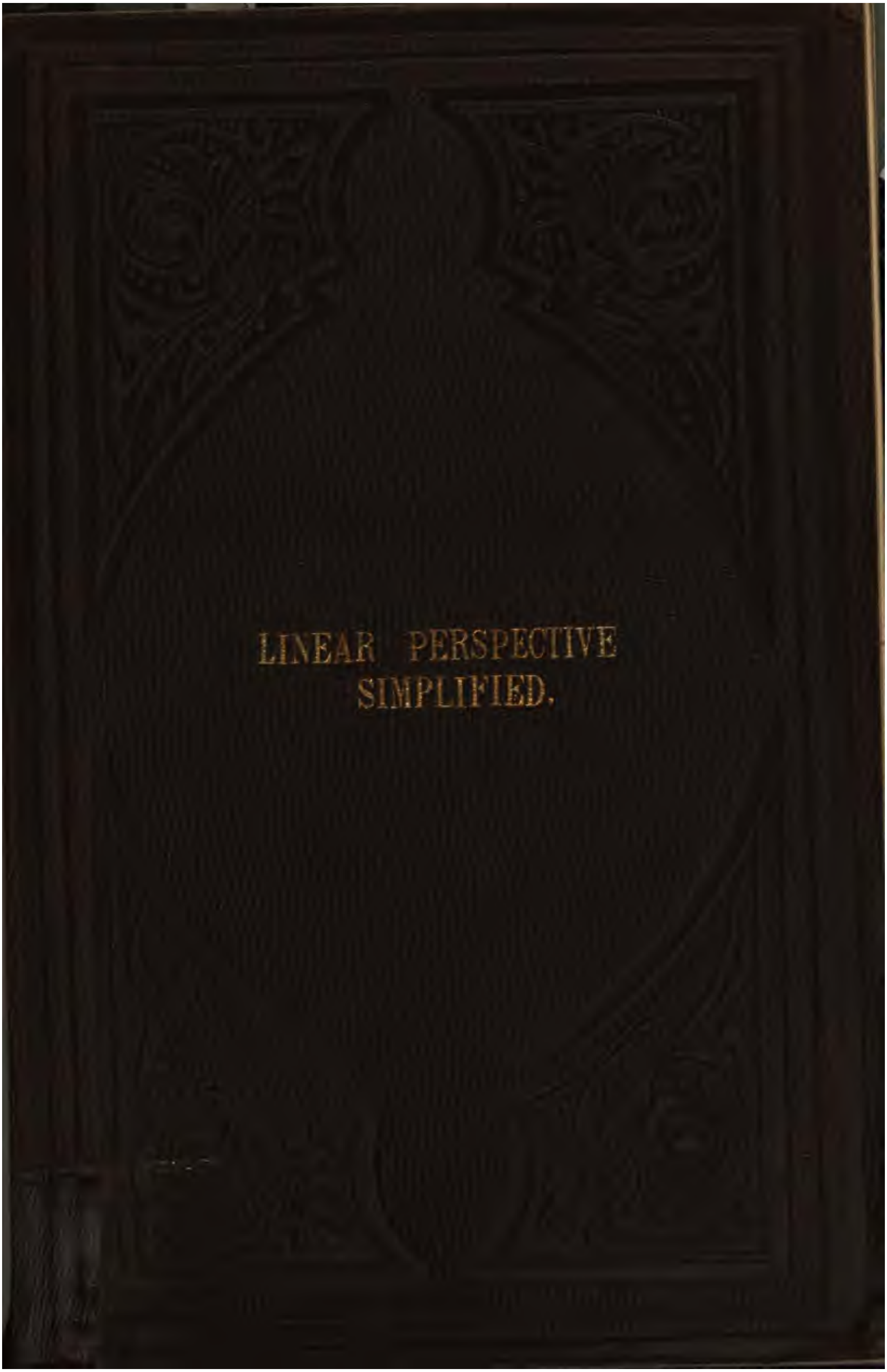

LINEAR PERSPECTIVE SIMPLIFIED.

LINEAR PERSPECTIVE SIMPLIFIED,

FOR THE USE OF

SCHOOLS, PHOTOGRAPHERS,

AND

Students in Art.

"VERITATIS SIMPLEX ORATIO EST."—CICERO.

BY J. HOLT.

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LINEAR PERSPECTIVE.

A PERSPECTIVE representation must be regarded as an outline, traced upon a transparent plane, vertically placed between the eye of the draughtsman and the object or scene that he copies: this principle is demonstrated in fig. 3, Pl. III. It is evident that, in following, upon glass, the outlines of an object, distortion would ensue, were not the eye placed at a height and a distance which, once chosen, remain invariable for that individual picture. That height of the eye corresponds with the height of the horizon. For all the purposes of perspective, the horizon must be considered as straight, and level with the eye; and it is always so marked upon the paper or canvass; see fig. 5, Pl. II. In figs. 1 and 2, Pl. I, the horizon is drawn as it would appear to the different personages. Where extent is circumscribed, as by mountains, trees, or the walls of an apartment, the horizon is still known to be at the height of the eye; see fig. 3, Pl. I, in which the dots upon the wall indicate the horizons of the respective persons. To one picture there can be only one horizon. No certain rule can be given for choosing the height of it: taste, and the character of the subject, must be consulted; but it may be remarked that a low horizon conveys the idea of a flat expanse, whilst a high horizon is appropriate in a mountainous view. Any high object prominently introduced into a drawing, with a low horizon, will seem increased in importance; see fig. 3, Pl. II. A small subject, for instance a dog, will, in general, be most consistently delineated with a high horizon; fig. 5, Pl. III.

Distance, once chosen, remains unchangeable for that picture. The distance is the space between the artist's eye and the transparent plane, or plane of the picture; fig. 4, Pl. II, in which the line P.S. to the eye of the female denotes the length of the distance.

A person in the centre of a circle, and looking straight before him, will include, in what is called his optical angle, a space represented by a certain number of degrees of the circle. The optical angle is greater or less, in different individuals: probably it never contains less than 45°, or more than 60°. Although, as a general law, every member of the human race is endowed with two eyes, those organs, excepting under disease or other abnormal condition, never communicate to the sensorium two images of the same object. Whether single vision depends upon the crossing of the innermost fibres of the optic nerves, at their commissure, is a question for physiologists, but irrelevant to the inquiries of the student in perspective, who must consider the word, eye, as implying the sense of sight in its unity.

Suppose fig. 5, Pl. I, to be a circular room; the eye in the centre would include 45°; the eye in fig. 4, exactly 50°, or nearly the seventh part of the surface of the wall. Taking that portion of the surface contained within 50°, and the eye being directly opposite to the middle of it, innumerable rays converge from the surface to the eye: they form a cone, or a pyramid, of rays, of which the basis is the surface of the wall, and the apex is in the eye. The external rays of the pyramid represent the width of the optical angle: the central is the principal visual ray; fig. 6, Pl. I. From P.S. to P.D. (the eye of the female) in fig. 4, Pl. II, is the principal visual ray. It is, in reality, always at a right angle with the horizon, although the exigencies of the flat surface, the paper or canvass upon which he works, usually compel the artist to mark the distance upon the line of horizon: see P.D. *, P.D. *, fig. 5, Pl. II.

In fig. 4, Pl. II, and fig. 5, Pl. II, the point of sight, P.S., is marked upon each canvass. The P.S. must necessarily always be indicated upon the horizon, precisely opposite the eye of the draughtsman; and there can be only one P.S. to one picture.

The point of distance is commonly set off, in perspective operations, as it is at either P.D. *, in fig. 5, Pl. II; but sometimes it is taken above, or below, from the P.S., and at a right angle with the horizon; as at P.D. or P.D. fig. 5, Pl. II. If two different dots are made as P.D., it cannot be too distinctly understood that they intrinsically signify the same length of distance: thus in fig. 5, Pl. II, each P.D. is equidistant from the P.S., and they would be found in the circumference of a circle described from the point of sight, P.S.

The base line of the picture, or transparent plane, is the lowest edge of the canvass or glass; and from it the delineation commences. It has been given as an established rule, that the distance chosen should never be less than the length of the base line: in many cases that distance will not suffice: the P.S. is sometimes much to the right, or to the left, of the middle of the horizon marked on the intended picture; thus a portion, as it were, of the pyramid of rays is unemployed; see fig. 8, Pl. I. Under such circumstances, it would be an abuse of perspective to take the length of the base line of the picture, as at *d*, for distance: even at *e* it would be somewhat exceptionably short. Fig. 7, Pl. I, shows what occurs when the distance is not sufficient: if the eye, *g*, advance to *h*, a considerable portion, *i*, *i*, of the line, (i. e. picture, or real scene), will be, on each side, excluded from the optical angle; and the same thing is demonstrated vertically, with the men and the pole, fig. 10, Pl. I. The man, A, that is at a suitable distance, would see all the length of the pole at once; but to B, the parts of the pole that are marked dark, would be invisible, so long as he restricted himself to his original optical angle. Again in fig. 1, Pl. II, the personage would have to throw back his head, and change his point of sight and optical angle several times in order to view the pole in its entire length; and all the upper parts of it would, if drawn by him, be greatly foreshortened.

The height of the figure itself is given as the minimum of distance, in studying from the antique, or from the living model; but unquestionably that is too little. For an erect statue, such a comparative distance as that in fig. 4, Pl. III, would be ample; but in copying from the front, the gladiator repellens, the perspective or foreshortening of which can be obtained only by constant recurrence to the principle of the transparent plane, even a longer distance would not be disadvantageous. Error is not likely to arise from drawing too far from the original: too short a distance is the frequent cause of distortion. This we sometimes find exemplified by enormous extremities in photographic portraits: the hand of a sitter is placed considerably before his body, and then, the camera being used at a short distance, a disproportioned picture is the result of the operator's ignorance of perspective.

Fig. 9, Pl. I, may be regarded as a panorama, of which, as it revolves, the eye in the centre receives under its optical angle only a seventh part: thus each seventh part is viewed alternately as a separate picture with its own peculiar point of sight.

The prime vertical is a line drawn upon the plane of the picture, fig. 2, Pl. IV. Its intersection with the horizon is always at the point of sight. Upon the prime vertical, the height of the eye from the ground may be, according to scale, computed: and upon the prime vertical certain inclined planes vanish; see fig. 4, Pl. XII, and its explanation.

Perspective is either Parallel, Angular, or Oblique.

PARALLEL PERSPECTIVE.

The two laws peculiarly regulating perspective of this description, are:—1. That all lines geometrically parallel, see B, B, B, B, fig. 1, Pl. IV, with the base line of the plane of the picture (transparent plane), continue parallel with it when they are in perspective.

2. That all lines perpendicular, A, A, A, A, fig. 1, Pl. IV, to the transparent plane, converge towards, and will if they be sufficiently prolonged, vanish in, the point of sight.

If, as in fig. 1, Pl. III, we take the ground plan of several columns, upon the same vertical plane, parallel with the transparent plane, or plane of the picture, and, setting off a very short distance, draw rays converging from the circumferences of the respective circles, we shall find, at the intersection of the rays with the flat plane of the picture, L, a greater space between *i*, *i*, and *m*, *n*, than between *j*, *j*. This circumstance has formed the subject of some disquisitions. The transparent cornea of the human eye, fig. 2, Pl. III, is concavo-convex, like a watch-glass, with its convexity outwards; and it is possible that, from reflection upon this fact, a solution of the seeming difficulty may be deduced. Were a greater, and therefore more suitable, distance chosen, for the purpose of representing the columns, the widths of the spaces between the rays in their passage through the transparent plane, would assimilate so closely as to render any difference between those widths totally unimportant to the artist, if not to the mathematician.

As to square forms upon the same vertical plane parallel with the transparent plane, and viewed under any ordinary optical angle, rays from their respective faces, such as 1, 1, 1, fig. 6, Pl. III, would unquestionably give equal spaces between them, at their intersection with the transparent plane or plane of the picture.

It may, therefore, be received as an axiom—that all lines of the same length among themselves that are placed upon the same vertical plane, parallel with the plane of the picture, appear of corresponding length among themselves, when in perspective: see fig. 2, Pl. II, and Pl. VI. The application of this rule is continual.

A SQUARE IN PARALLEL PERSPECTIVE.

The female in fig. 3, Pl. III, is represented as she would be seen, if she were, by means of a real distance, drawing the perspective or foreshortening, *b*, of the line A. It is easy to imagine a square, instead of A, and then, as in the case of A, the foreshortening would be in the direction of the arrow, from 1* to 2*. In fig. 3, Pl. IV, the arrow shows the direction in which the foreshortening is defined. On an opaque surface lines of construction are unavoidable: accordingly, one side A.B. of a square being given, and it being known that the vanishing sides must converge to the P.S., all that remains is, to determine the perspective depth of the square. For that purpose a point of distance, P.D., to the right, or to the left of the P.S., is taken upon the horizon, and from that P.D. a line to A, and another to B, act like the rays from 1* and 2*, fig. 3, Pl. III. The line *c*, fig. 3, Pl. IV, would be unnecessary in practice, but is introduced here, to show the analogy; *d*, by its intersection at *f*, with the ray ascending to the P.S., gives the depth of the square; and this last is completed by a horizontal to *g*. The construction rests upon the similarity of the two real triangles.

ADDITIONAL SQUARES.

From the P.D., fig. 1, Pl. V, another diagonal, *i*, drawn to *h*, will give a second square perspectively of exactly the same dimensions as those of A. A repetition of diagonals, as at *k*, *l*, *m*, will afford as many squares as can be required, all of them of equal size, but in perspective.

INCREASING THE DEPTH.

Suppose it necessary to add 3 feet in depth to the square 10 feet, B, fig. 2, Pl. V, 3 feet are set off upon the base line, from 7 to 10. From 7, a ray is drawn to the P.S., and, to the intersection of that ray with the outline of the square, at *a*, a diagonal is brought from the P.D. That diagonal cuts the vanishing ray at *b*, and gives the perspective additional depth of 3 feet. The 3 feet might be gained in two other ways: 1. By setting off 3 feet more, upon the base line at *, and producing the diagonal *z*, to *. 2. By dividing the outline *c*, into 10 feet, and drawing a line to the third of those divisions at *a*.

FRACTIONAL DISTANCE.

In figs. 1 and 2, Pl. V, the whole distance is set off at P.D. externally to the margin of the picture; as if the canvass were placed against a wall, and the P.D. were marked beyond the margin of the picture, and upon the wall. In fig. 3, Pl. V, only a quarter (20 feet) of the distance, 80 feet,* is employed; and it is upon the canvass itself, at P.D. From P.D. a diagonal is drawn to 2½ (the quarter of 10 feet) upon the base line; and the result is the same as if the whole distance, 80 feet, and the whole side, 10 feet, of the square, had been used in the construction. All that is requisite is, that the fraction of the distance should correspond with that of the line subjected to operation.

Pl. VI. The house, fig. 1, is 6 feet from the base line of the picture. The ground is level. The horizon is 15 feet high; so that the draughtsman is on a slight eminence. The distance is 96 feet. A third of it is taken, 32 feet, marked P.D. A diagonal to 2 gives, by intersection with *b* to P.S., the six feet required. From the intersection an indefinite horizontal is produced, for the base line, *c*, of the house. That side of the house which is parallel with the transparent plane is 20 feet wide, 30 feet high. 1, P.S., and 20*a*, P.S., include 20 feet in perspective upon *c*. From *x*, *x*, two perpendiculars are erected, and 30 feet measured from line *c*, and marked on each perpendicular, will, with the horizontal *z*, complete this side of the building. 20 *a*, P.S., and *, P.S., show the inclination of outline of vanishing side B, which is 30 feet wide. On *c*, 30 feet are set off at 30; but as one-third distance is employed, 10 feet and the diagonal P.D. 10, give the apparent width of 30 feet by the intersection, at *s*, of the diagonal P.D, 10, with ray 20 *a*, P.S. From *s*, a perpendicular cuts *, P.S., at *j*, and defines the outline of side R. In order to draw the roof, the invisible sides of the house must be treated as if they were visible. From *s*, a horizontal to *y*, cuts 1, P.S.; a perpendicular from *y*, to *i*, cuts *e*, P.S. at *i*; and the invisible side L, is completed by the horizontal *i*, *j*. The middle of side R, is found by the crossing of the diagonals; through their intersection the indefinite perpendicular *o*, is erected. From the foot of *o*, at *f*, a horizontal to *h*, divides the floor; from *h*, an indefinite perpendicular gives the middle of side M, 5 feet measured from line *c*, and set off on the produced outline *, 5, and then a ray drawn from 5 to P.S., give at *o*, by intersection with *o*, *f*, the perspective height of the roof: from *o*, a horizontal cuts, at *p*, the perpendicular from *h*, and gives the top of the roof; the slopes *e*, *p*, and *, *o*, with *j*, *o*, and *i*, *p*, finish the construction.

The man at D, being upon the same vertical plane parallel with the plane of the picture (transparent plane) as *y*, *s*, six feet taken on *y*, *s*, and placed vertically at D, give his height. The girl is on the same plane; and 4 feet are her stature. The base line of fig. 2, being upon the same plane, 5 on the corner marks the height of the window from the ground. The window itself is 4 feet high. Rays 5, P.S., and 4, P.S., give the perspective height of the window. The measurements on the whole front of fig. 2, are taken from feet of line *y*, *s*. Dotted lines are carried to the perpendicular E, and from E, rays to the P.S. determine the height of the windows upon the vanishing side G. But obtaining the height of windows cannot suffice: it is essential to be able to draw them of given widths, and at given intervals. In order to avoid the confusion that arises from multiplicity of lines, in a small diagram, various methods of dividing vanishing surfaces are given in Pl. VII.

The rays 1, P.S., 20*a* P.S., in Pl. VI., include between them, transversely, 20 feet all the way up to the horizon. In like manner, 20 P.S. and 30 P.S. give 10 feet. Means are thus afforded for ascertaining the height of objects, or the stature of personages in any part of the perspective: refer to fig. 2, Pl. II. The man at K, Pl. VI, is 5 feet high. The figure with the flag is 5 feet high, and the staff of the flag is 15 feet long. The plane of the picture is 41 feet high; 2 feet are set off at Q; from thence two rays are drawn to the P.S.; and they determine the width of the body and extended wings of the bird, that is 41 feet from the ground. The other bird is at 53 feet from the ground; the width being carried up by the two verticals, *t. v.*

The visible reveals of fig. 2, would be most conveniently obtained by marking the P.D. again at W, and operating upon the base line of the door, and that of the lowest window, in a manner exactly similar to that in which the perspective depth of side B, fig 1, was found. Perpendiculars would carry up, from the door and the lowest window, the perspective widths of the reveals of the windows above. The construction, being a mere repetition of one explained already, is omitted, as likely, by multiplicity of lines, to perplex the unexperienced.

Fig. 6, Pl. 12.—A ground plan and an elevation of the interior of a room, in parallel perspective. The ground plan must be made according to scale. A section-line supplying the place of a real transparent plane, gives at *f*, *e*, *i*, *d*, &c., the perspective widths. The horizon is marked upon the elevation, and the P.S. must coincide exactly with the P.S. of the ground plan. The vanishing lines A, A, A, A, are led to the P.S., and the widths are taken from the section line, and placed at *f*, *e*, *i*, *d*, &c., on the horizon. Through those points on the horizon, perpendiculars are ruled, until they intersect the rays A, A, A, A. The figure, better than words, explains the construction. A very convenient way of transferring the widths from the section line to the horizon, is, to mark them upon the perfectly straight edge of a piece of thin card-board, which can then be applied, like a measure, upon the horizon of the elevation.

DIVISION OF VANISHING LINES AND SURFACES.

In fig. 1, Pl. VI, the middle of the vanishing side of the house is found by two diagonals. This is, in some cases, an available method of dividing vanishing surfaces, as at *a*, *a*, *a*, fig. 1, Pl. VII. A repetition of the operation, upon each half, divides the vanishing surface into three portions, equal perspectively. But in many instances, this mode of dividing is inapplicable, on account of the number of diagonals required.

The vanishing line A, 6 feet long, in fig. 2, Pl. VII, being geometrically at a right angle with the plane of the picture, necessarily vanishes in the P.S. Rays drawn from the P.D. to the feet according to the scale, upon B, will at their intersection with A give the divisions required. If the half distance be employed, then half of each foot must be taken; and so on in proportion; for these lines from P.D. may each be considered as the diagonal of a square of 1 foot. (See figs. 1 and 3, Pl. V, and their explanation.

Fig. 3, Pl. VII. A window vanishing in the P.S.—The window is 1 foot from the ground, 6 feet high, 6 feet wide. It has, in its width, six panes, each 1 foot wide, 1½ foot high. The wall is 9 inches thick, and the reveal of the window is 6 inches broad. The whole distance is taken. Six feet are set off on F. A perpendicular is erected at 9; on that perpendicular 1 foot for the height from ground, and 6 feet for the height from window, are set off. P.D. 6, shows, by intersection with line E, the width of the window. *a*, P.S., gives the bottom external edge *k*; and *d*, P.S., shows the top external edge *m*, of the window. The perpendicular, L, cuts *d*, P.S., at *h*, and completes the external outline of the window. The nine-inch thickness of wall must be treated as if visible throughout. *, *a*, and *d*, *g*, are 9 inches horizontally. The perpendicular, *, *g*, and then *, P.S., and *g*, P.S., define the thickness of the wall. Six inches taken from *a*, towards *, and the perpendicular erected, *q*, 8, show the breadth of the reveal. Then 8, P.S., and *q*, P.S., give the sash at top, and at bottom. Lines from the P.D., to the feet on F, give on line E the points of division. Perpendiculars, C, carry up those to *k*, the external edge of the window; horizontals corresponding intersect *q*, P.S., and show, at the intersections, the positions of the perpendicular sashes. For the horizontal sashes 8, *q*, is divided into four equal parts, and from *z*, *z*, *z*, rays, to P.S., give the inclinations required. The horizontal from *h* to the ray *g*, P.S., and the corresponding horizontal at the bottom of the reveal, complete the construction.

The method of dividing shown in fig. 4, Pl. VII, is very useful. The vanishing wall is known to be 32 feet long. The spaces appropriated to windows are 4 feet wide; there are 5 feet between each window, and 5 feet at either end of the wall. Thirty-two divisions are set off at will, on A, and from 32 to B, a line is drawn, and then produced, till it cuts the horizon at C, which is the vanishing point of the converging lines from 5, 4, 5, 4, &c. The intersections of these lines with B, the vanishing base line of the wall, give the points of division, which are carried up by perpendiculars, as in the preceding operation.

Fig. 5, Pl. VII.—Perpendiculars are obtained at equal perspective distances from each other. Divisions are set off, at will, upon the perpendicular B, and, from them, rays are led to the vanishing point V.P. A diagonal from *c* to *d*, intersects the rays, and shows the points of division for the perpendiculars.

ANGULAR PERSPECTIVE.

Figs. 1, 2, 3, Pl. VIII.—A cube, or a square building, having one of its diagonals A, A, A, parallel with the plane of the picture, and its other diagonal perpendicular, B, B, B, to that plane, is in angular perspective. The sides are at an angle of 45° with the plane of the picture, (transparent plane), and lines at an angle of 45° with that plane vanish in the point of distance.

For the purpose of operating upon paper it is necessary to mark the P.D. (point of distance) twice upon the horizon; and the two P.D. being intrinsically the same point (see fig. 5, Pl. II.) must, of course, be placed as equidistant from the P.S.; see fig. 4, Pl. VIII. In Pl. VI, by the rays 20 and 30, ten feet were carried perspectively as far as the horizon; and it was shown that every horizontal, transversely extending from one of those rays to the other, and parallel with the transparent plane, must be 10 feet long. In an analogous manner, if we carry up the length of the parallel diagonal A, A, fig. 4, Pl. VIII., to the base line at B, B, two rays from B, B, to the P.S., will include the length of the like diagonals of all the squares of the same size perspectively, that could be made, as far as the horizon. The rays C, C, to P.D., P.D., give the vanishing of the nearest sides; and by their intersection with the rays from B, B, to P.S., determine at *f*, *f*, the length and the place of the parallel diagonal *a*, *a*, D, D, to *f*, *f*, complete the sides that are most distant from the plane of the picture.

Fig. 5, Pl. VIII, a summer-house.—Its general perspective construction is explained by that of fig. 4. The wall, 8 feet high, is taken on *o*. The height of the roof is marked at 4 upon *o;* and a ray from 4, to the P.S., cuts the vertical R; thus the perspective height of the apex of the roof is determined.

Pl. IX.—The summer-house enlarged to double the size, for the purpose of showing the perspective construction of the door, and that of the window. In fig. 4, Pl. VIII, rays drawn from B, B, to the P.S., determined perspectively at *f, f*, the length of the parallel diagonal of the square; but supposing sides G, G, of the ground plan, to be carried up to H, H, and D, D, to be produced to H, H, then D, D, by intersection with C, C, give the length of the parallel diagonal; and D, D, by intersecting each other at *k*, define the square in perspective. Although, in forming a number of squares, it would not be advisable to adopt this last method of construction, on account of the space that would be required upon the base line, it is expedient to do so in Pl. IX. For the width of the door, fig. 1, 3 feet are carried up to A, L, on the base line, and rays from A, L, to P.D., 1, show the width of the door upon the vanishing base line, *o*, of the house. The nine-inch thickness of the wall is carried up to B; and B, P.D., 2, gives the visible perspective width of the sill. On the perpendicular, at C, 7 feet are taken for the height of the door, which height is given perspectively by C, G. Where the ray from P.D., 1, to A, cuts *o*, a perpendicular is erected to intersect C, G, at P; and it gives the nearest visible outline of the door. P.D., 1, to L, defines the place for the corresponding outline M. The perpendicular at S gives the invisible thickness of the wall: the visible is shown by perpendicular I. N, from P.D., 1, to P, gives the top invisible slope of the thickness of the wall; the bottom has been already marked by P.D., 1, to A. P.D., 1, to L shows the like slope, at the bottom of the visible thickness of the wall; and *z*, Q, give it at top. Ray P.D., 2, V, intersecting N, P, completes the figure in perspective.

In fig. 2, Pl. IX, the window being only 6 inches deep in the wall, only 6 inches are carried up, from the ground plan, to B, in other respects the operation is very similar to the preceding one; and the figure affords its own explanation.

OBLIQUE PERSPECTIVE.

Lines that are *not* at an angle of 90° with the transparent plane, and lines that are *not* at an angle of 45° with it, are in oblique perspective. In fig. 1, Pl. X, the rectangular forms, if seen through the transparent plane F, would appear in oblique perspective, and the vanishing points of lines, under such conditions, may be readily ascertained.

The lines A, D, fig. 2, Pl. X, being given, their vanishing points are found by setting off a distance, as at C, and through the point of sight C, a line, geometrically parallel to A, is carried, until it intersects the horizon at V.P. *x*. The vanishing point of D is found at V.P. *z*., in a similar manner, by a geometrical parallel to D.

Fig. 2, Pl. XI, is the ground plan of a house in oblique perspective. The house is 17 feet long, 12 feet wide. R.S., two geometrical parallels to two sides of the ground plan, intersect the section line, which holds the place of a transparent plane, and give the vanishing points on either side. These vanishing points V.P. 1, and V.P. 2, are carried up from the section line, to the horizon of the elevation, fig. 1, Pl. XI, by lines *y*, *y*. The house is 21 feet high; its roof is 5 feet high. The lines D, E, F, G, H, I, K, L, M, to the vanishing points, indicate the outlines. From *, * the perspective breadths are taken upon the section line at *b, b,* fig. 2, and set off upon the horizon of the elevation at *b, b, b;* then perpendiculars through those points, show the perspective widths of the sides at *o, p*. A ray from V.P., 1, to *x*, fig. 1, would, by giving the place for *z*, obviate the necessity of drawing diagonals upon the invisible side of the house. In fact, the perspective width of the middle of side T, of the house, might be taken upon the section line of fig. 2, then on the horizon of the elevation, and the diagonals might be dispensed with altogether.

In order to avoid confusion of lines, fig. 3, Pl. XI, is intro duced, and the door in it is made very large; 12 feet high, 8 feet wide. The height of the door is set off at *a;* ray *b,* gives the perspective height of the door; space *c,* at the nearest corner of the ground plan, fig. 2, is taken on the section line of that figure, and set off on the horizon at *d,* fig. 3, Pl. XI. Through *d,* a perpendicular erected to cut ray *a, b,* gives the nearest outline of the door. Space *j,* taken on the section line of fig. 2, and set off on the horizon of fig. 3, at *e,* shows the place for another perpendicular to complete the external outline of the door. On the section line the invisible thickness of the wall is given by the ray to 9 (in). *a,* to V.P., 1, determines the invisible height; the invisible thickness is marked by perpendicular *h, g; g* to V.P., 2, defines the apparent thickness over the door; *h,* to V.P., 2, gives the visible width of the sill; *f,* to V.P., 1, cuts *h,* to V.P., 2; *i,* to V.P., 1, intersects *g,* to V.P., 2; and, at the intersections, the perpendicular, *k,* completes the construction.

Fig. 4, Pl. XI. The perspective width of the window is found at Q, upon the transparent plane, or section line of fig. 2, Pl. XI, and then transferred to the horzion of fig. 4. The width of the reveal must be considered as having been taken on the section line of fig. 2, although, in reality, the rays are omitted, in order not to distress the eye by too numerous lines, in a diagram of such very small dimensions.

THE CIRCLE IN PERSPECTIVE.

The cylinder placed vertically, A, fig. 3, Pl. XII, has its hoops apparently less and less curved as they approach to a level with the horizon.

The interior of the cup, *c,* fig. 3, Pl. XII, is seen; for the vessel is, like the circle, fig. 1, Pl. XII, below the horizon. Of B, fig. 3, Pl. XII, the bottom of the circular foot is visible, for the cup is above the horizon.

A circle in perspective appears elliptical. There are several ways of putting a circle into perspective, some of them so complicated as to be inapplicable to the operations of the draughtsman, but the method shown in fig. 1, Pl. XII, is convenient, and unquestionably accurate enough for every graphical representation. A square is drawn in perspective, fig, 1, Pl. XII, from the middle of the base line of the square *, a half circle is described, and then divided into eight parts. From each point of division 1, 2, 3, &c., a perpendicular is erected to *a, b, c, d, e, f, g.* From *a, b, c, d, e, f, g,* rays are led up to the P.S.; and where they are intersected by the diagonal *h, s,* as at *i, k, l, m, n, o, p,* horizontals are ruled through the intersections. Those horizontals point out where the periphery is to pass, and, by hand, it must be delineated.

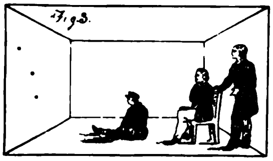
Fig. 2, Pl. XII., is another arrangement for placing a circle in perspective. This mode is expeditious, and suitable for arches. The point of distance being marked vertically over the point of sight, a circle in perspective may be obtained by means of rays to the P.S., and a diagonal from the P.D., as in the preceding construction. The method shown in fig. 2, Pl. 12, is frequently adopted in a perspective imitation of a geometrical ellipsis.

INCLINED PLANES.

They vanish on a perpendicular erected from that point in which the vanishing base line of the original forms to which they belong, vanishes. A, fig 4, Pl. XII, is parallel with the transparent plane; B is perpendicular to that plane; and consequently vanishes in the P.S. From the P.S. a perpendicular is raised; and C vanishes upon that perpendicular, which is the prime vertical. In the roof, fig. 1, Pl. VI., the slopes *e*, *p*, and *, *o*, vanish above the margin of the picture, and on the prime vertical. In a similar manner, *i*, *p*, and *j*, *o*, would vanish upon it; but much below the base line, or lower margin of the picture. In fig. 5, Pl. XII., the base line of H is *not* parallel with the transparent plane; and I vanishes in a point that is *not* the P.S.: it is an accidental point. The two lines of H vanish upon a vertical, directly over the V.P. of I. To give the appearance of a road, L, leading down-hill, all that is requisite is, to draw the outlines of it so, that if sufficiently produced, they would vanish *beneath* the horizon. Two vanishing lines like H, converging above the horizon, will represent an acclivity in perspective.

Having sometimes observed difficulty to arise from figures of reference not corresponding with their accompanying text, the author of this compendium of perspective resolved to avoid such a fault, by engraving his own diagrams. That he is quite unaccustomed to the manipulation of the burin is self-evident; but he believes that, for any defect of execution, accuracy in matters of greater importance will be an ample compensation.

Richard Barrett, Printer, 13, Mark Lane, London.



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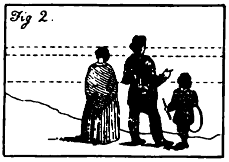

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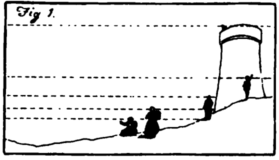

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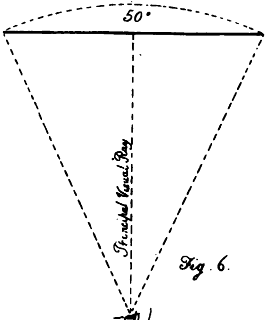

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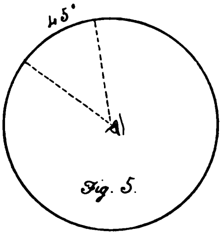

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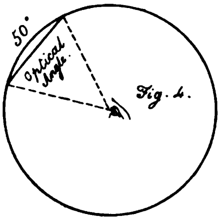

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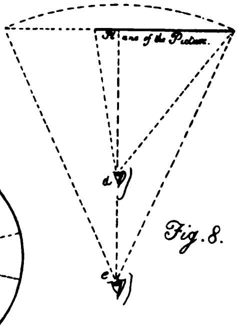

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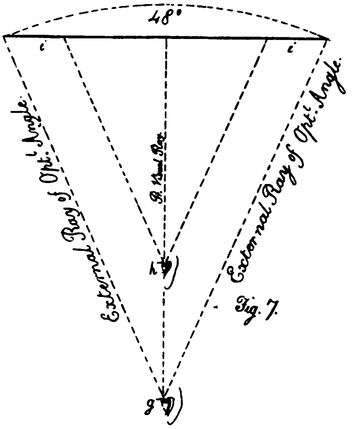

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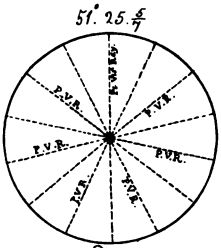

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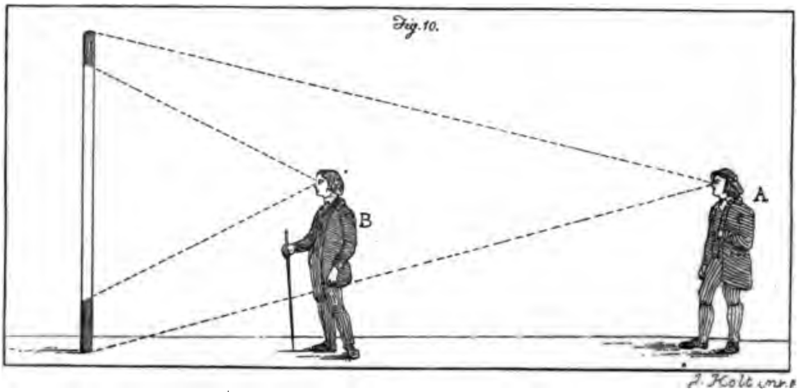

Fig. 10.

J. Holt imp.

[illegible] Holt 15 [illegible] Road Hackney [illegible]

Pl. III.

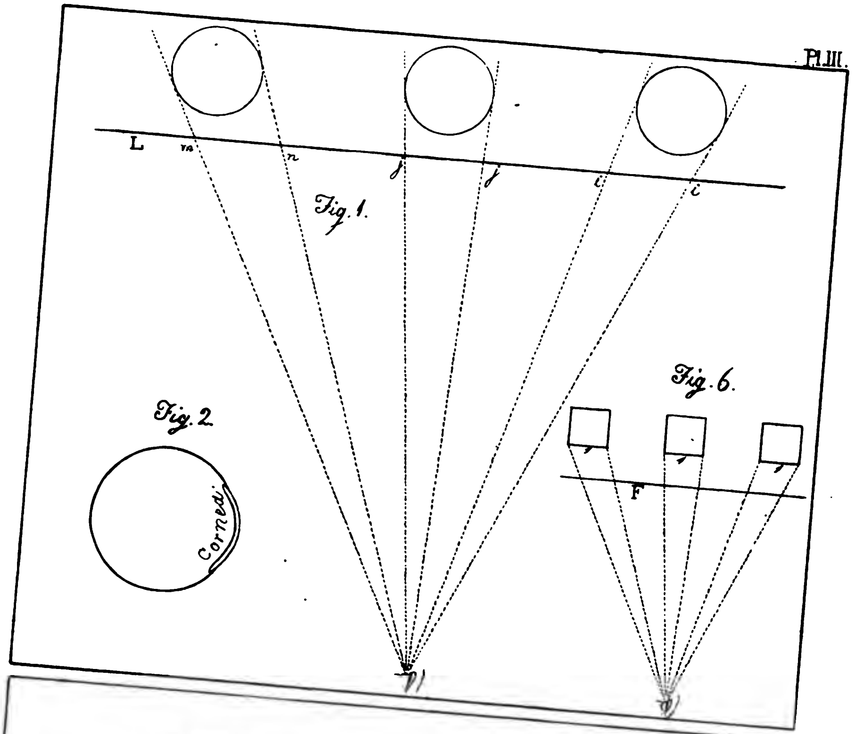

Fig. 1.

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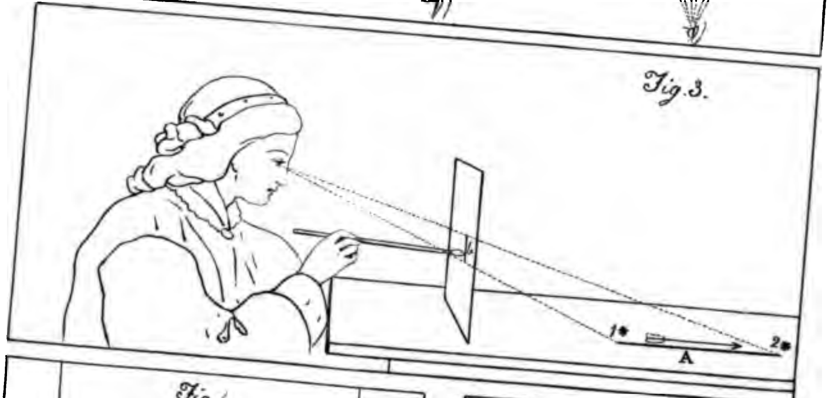

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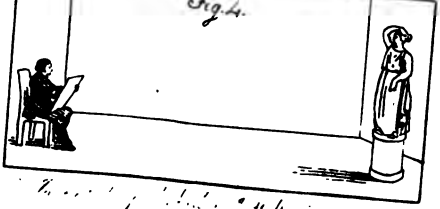

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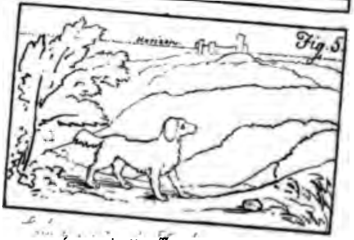

Fig. 5.

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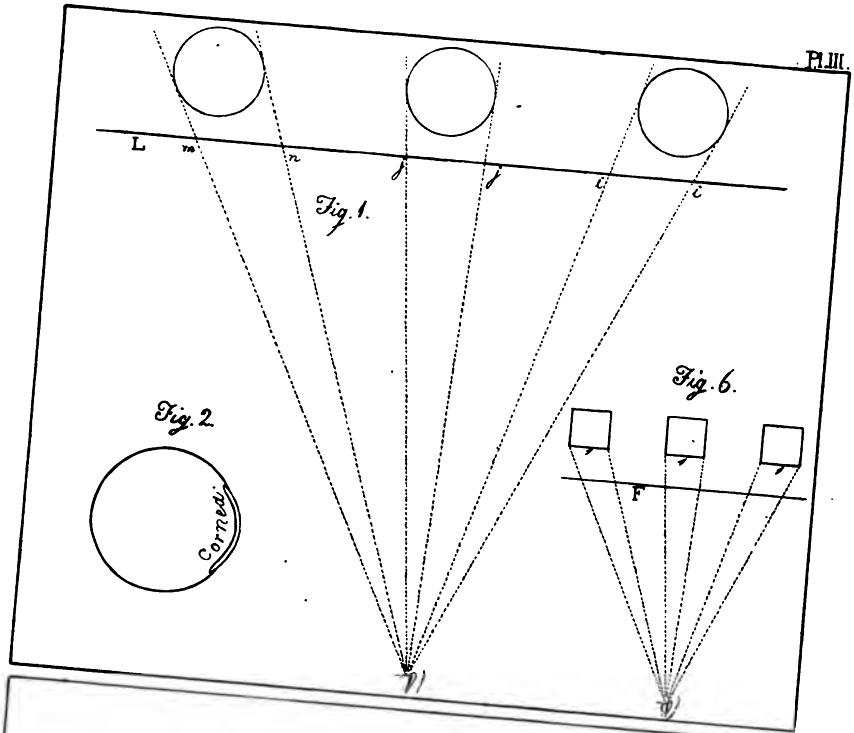

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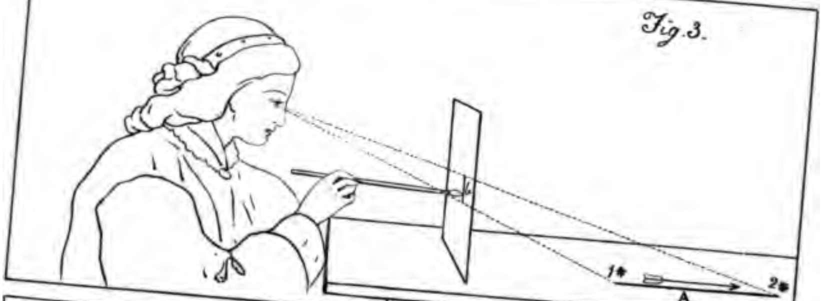

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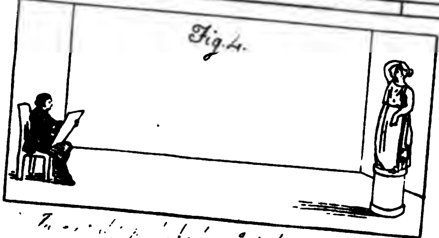

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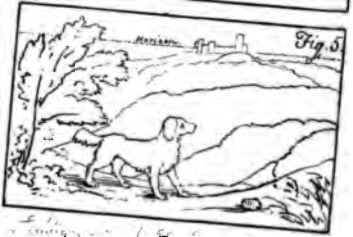

Fig. 5.

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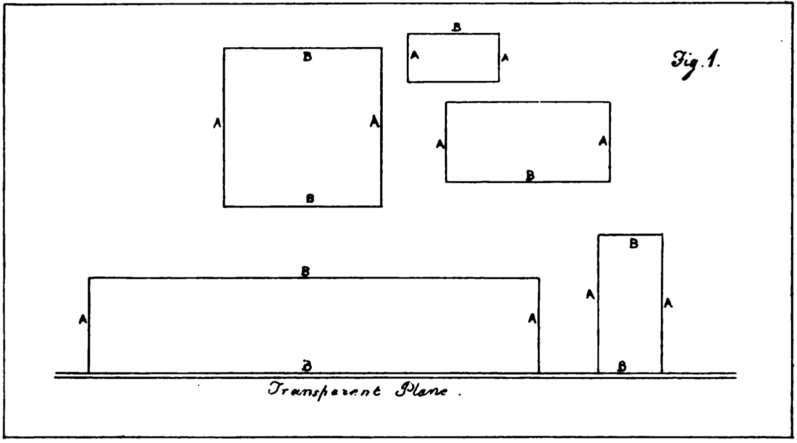

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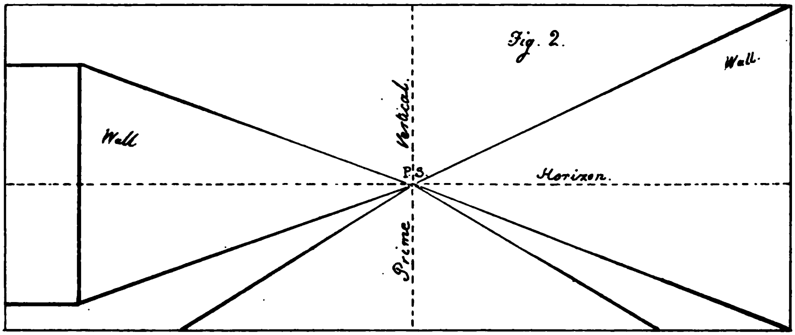

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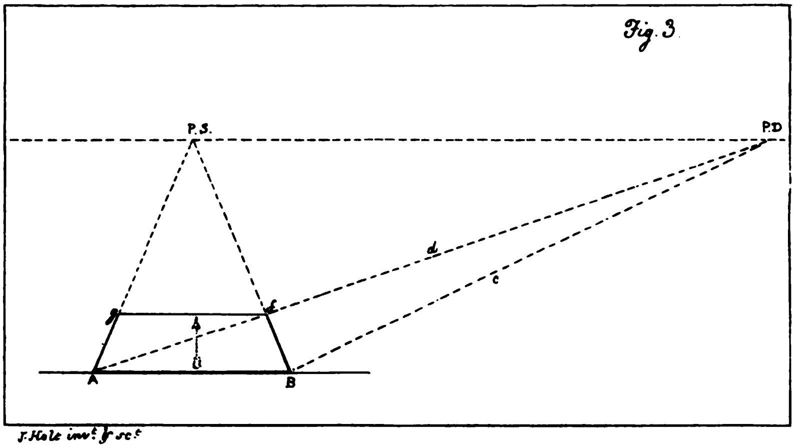

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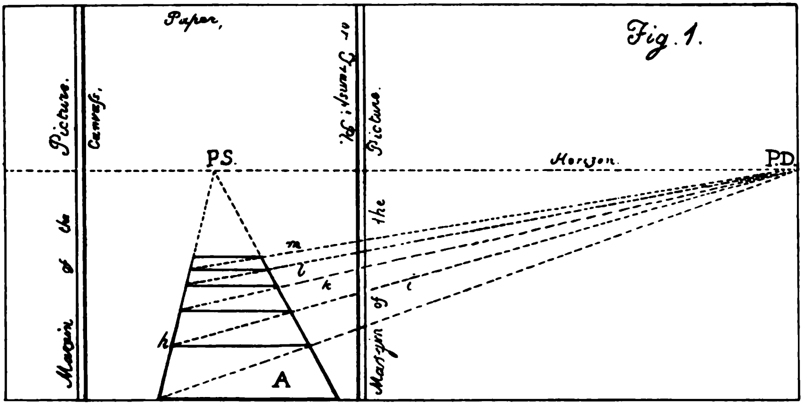

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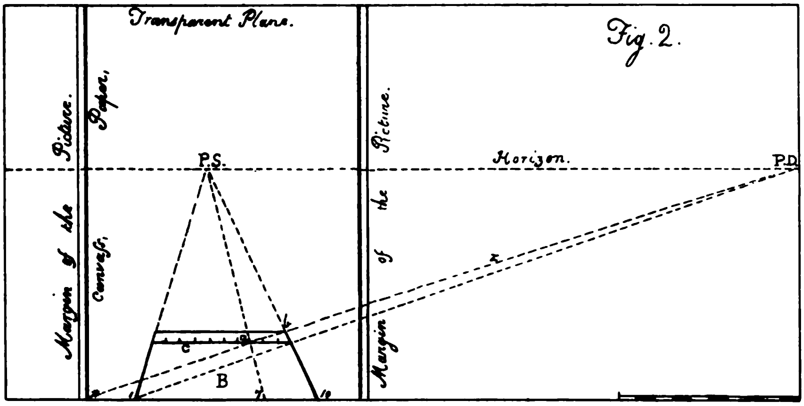

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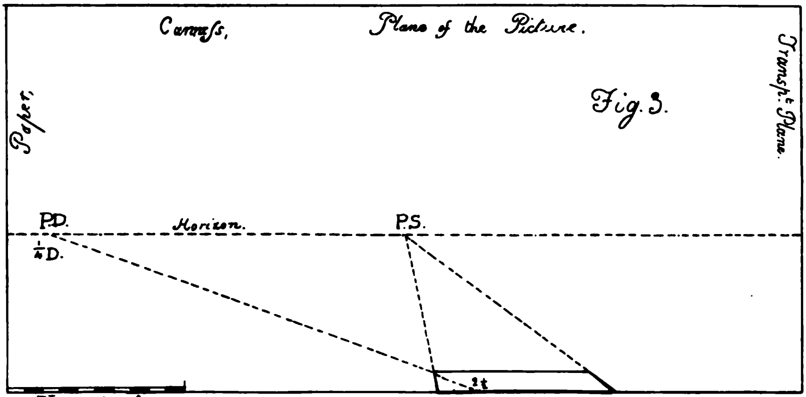

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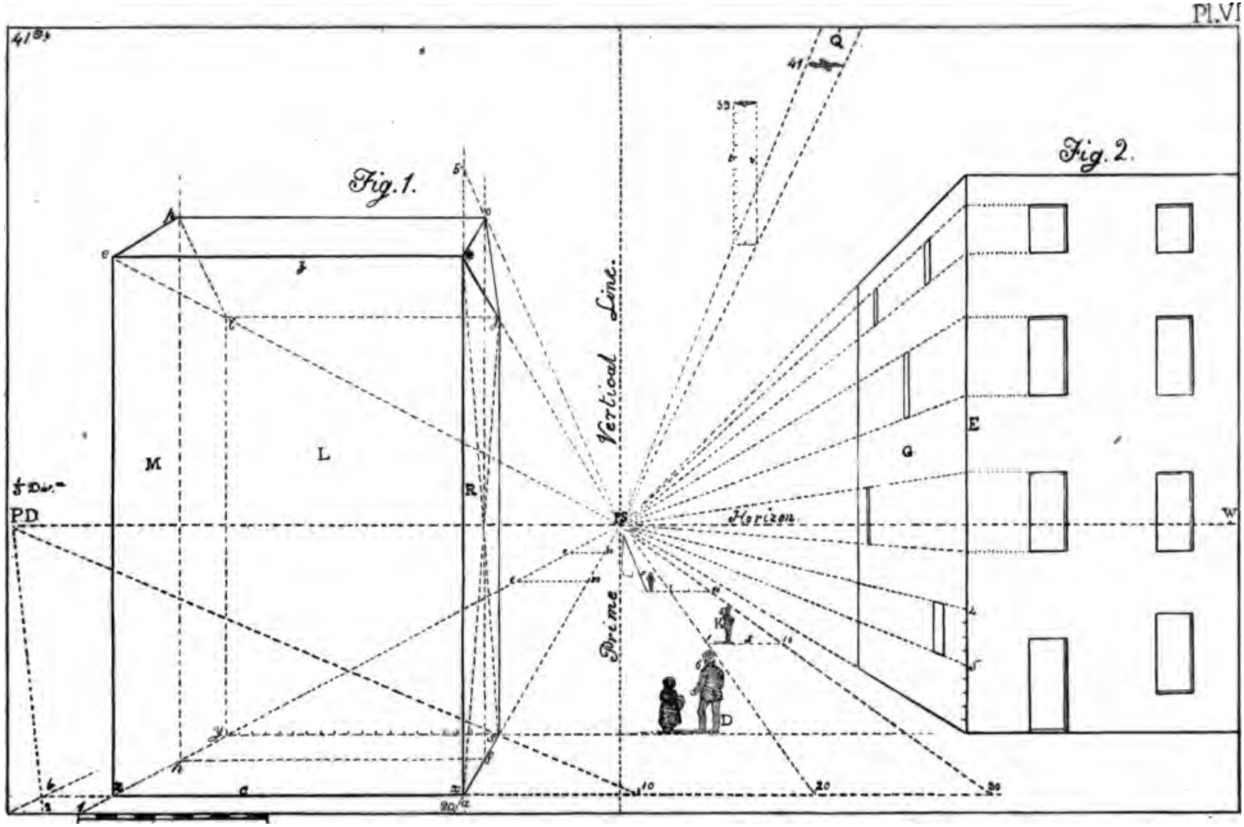
Pl.VI.



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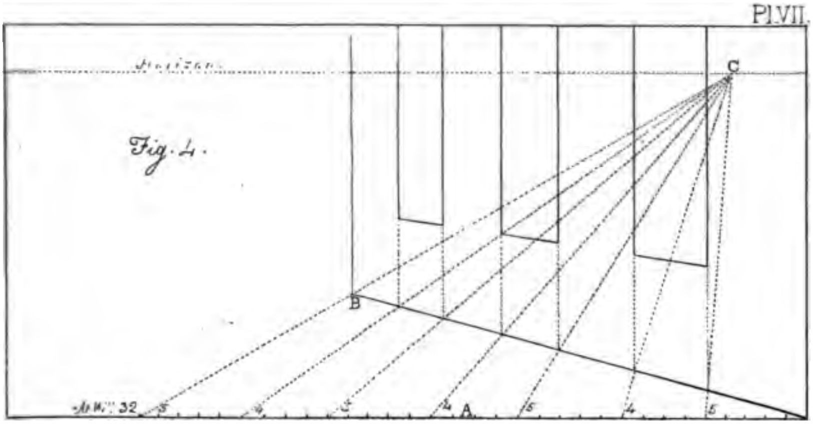

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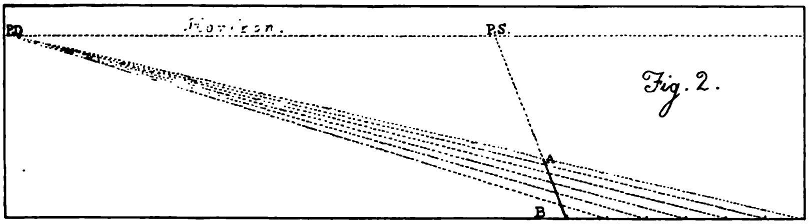

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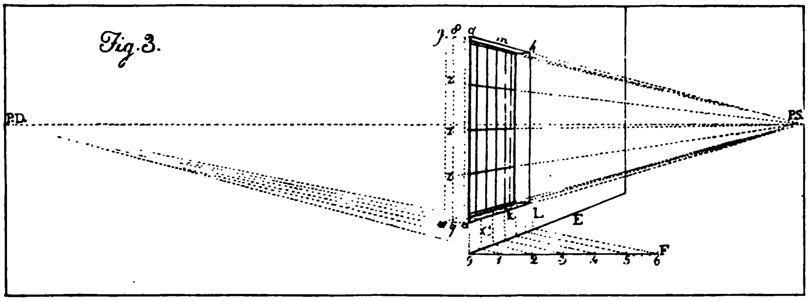

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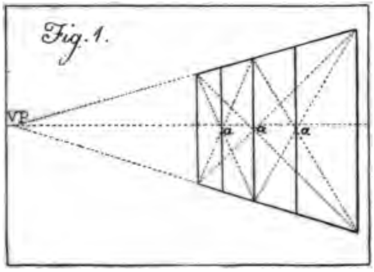

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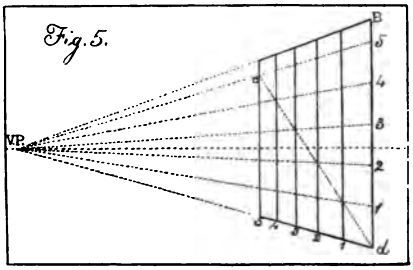

Fig. 5.

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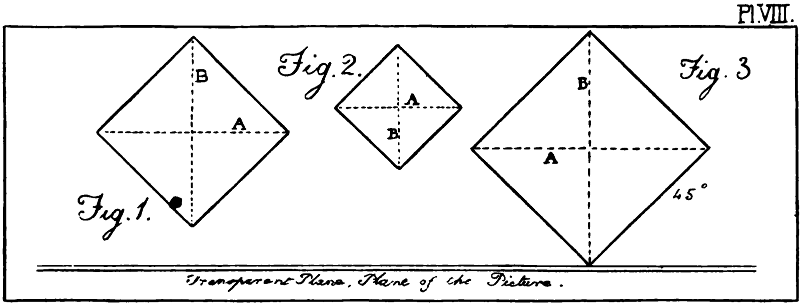

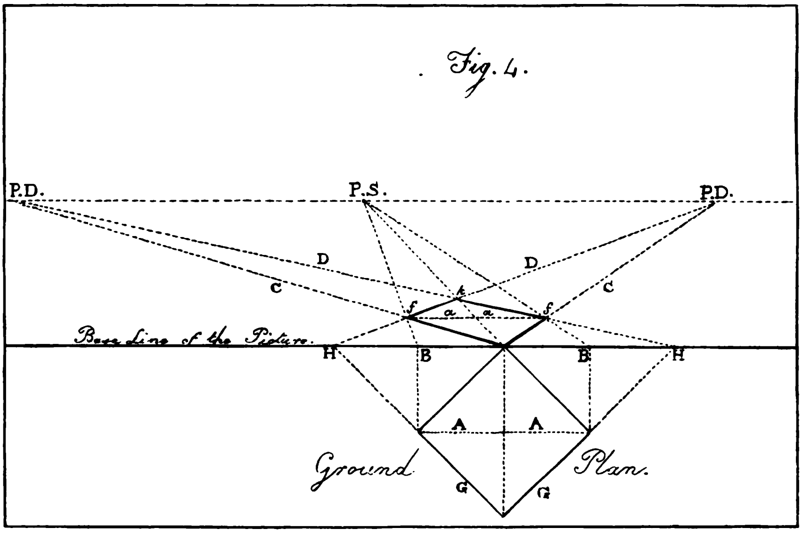

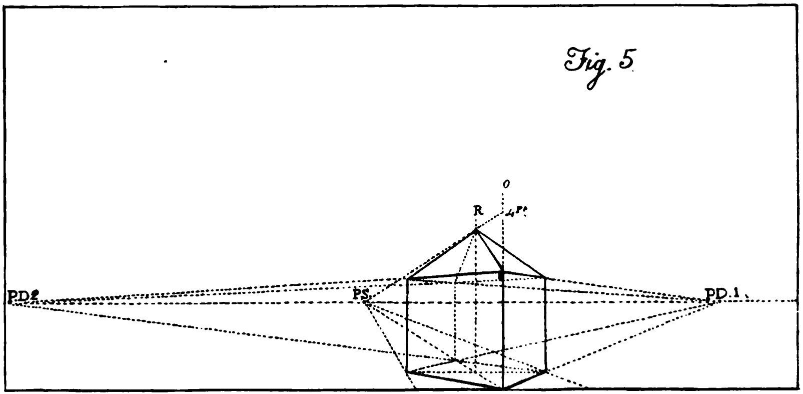

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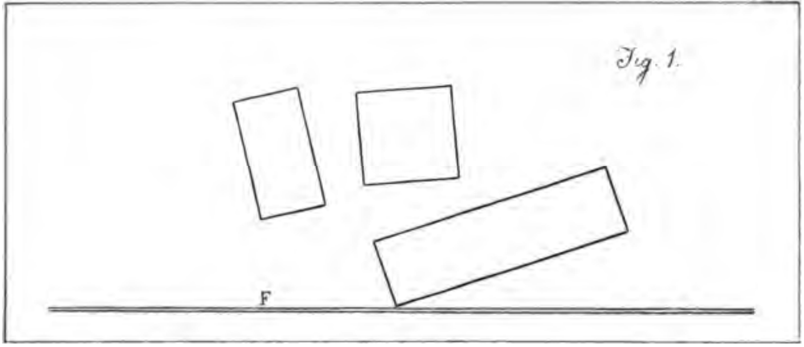

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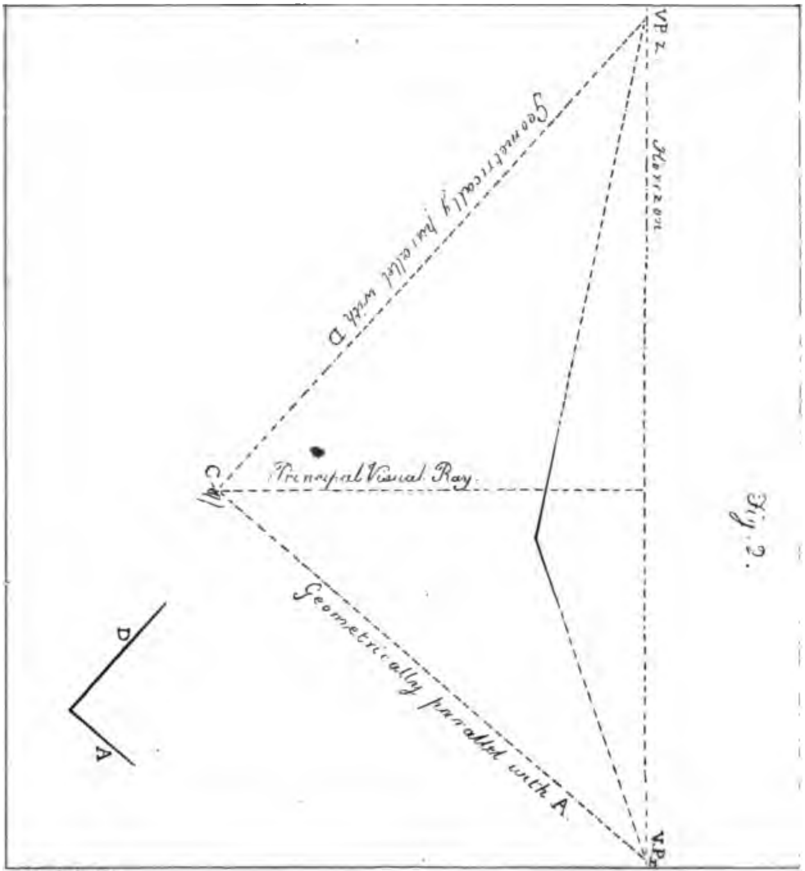

Fig. 2.

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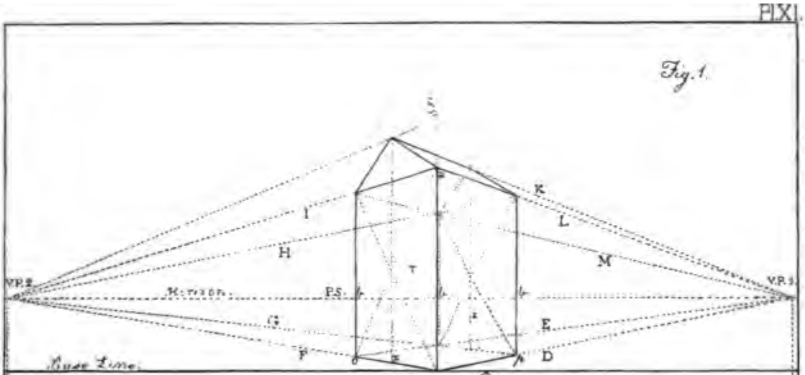

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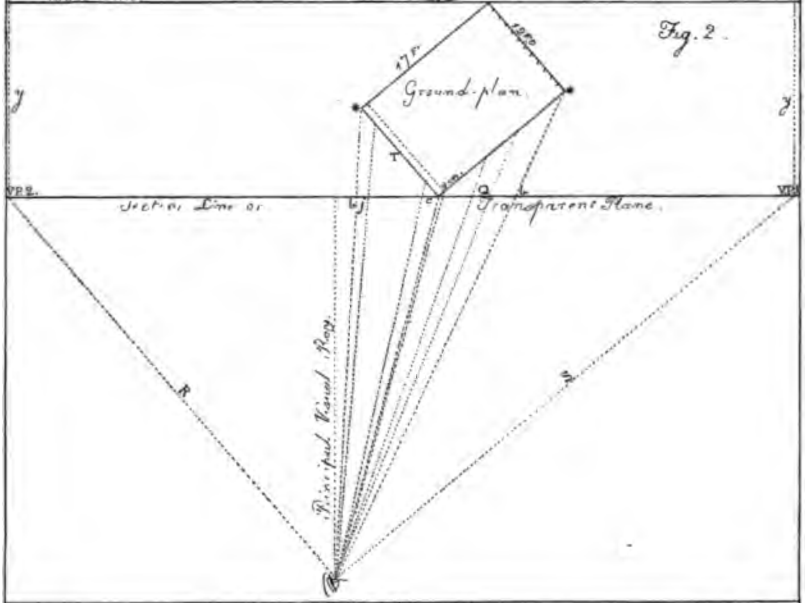

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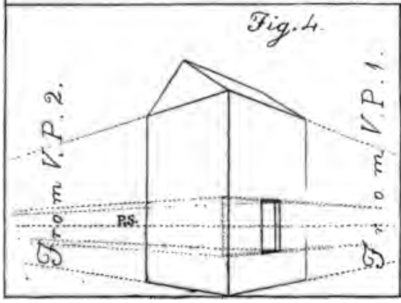

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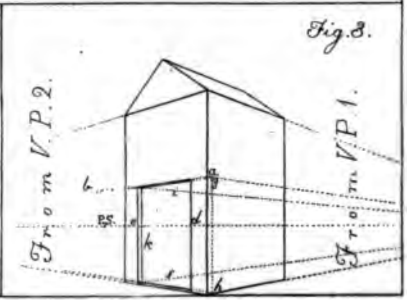

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Pl. XI.

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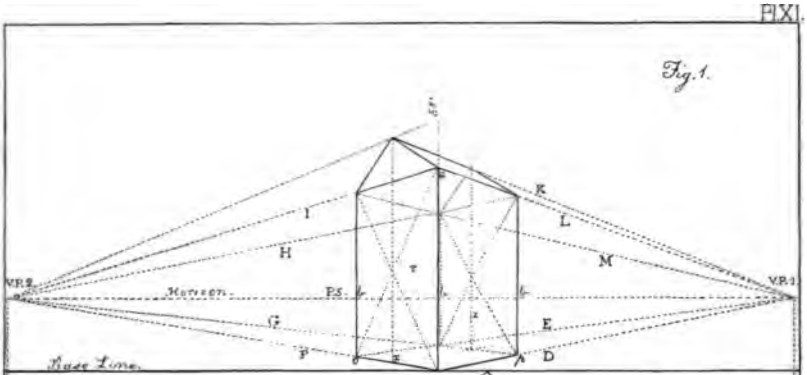

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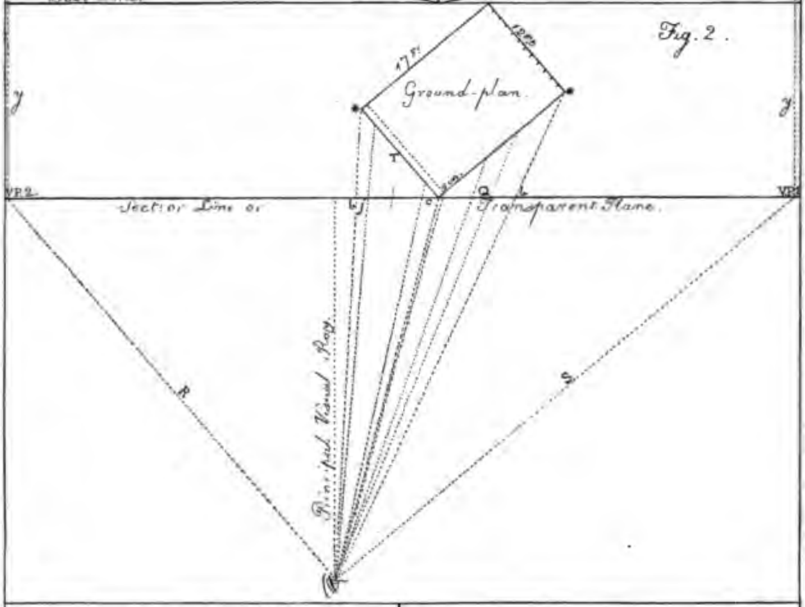

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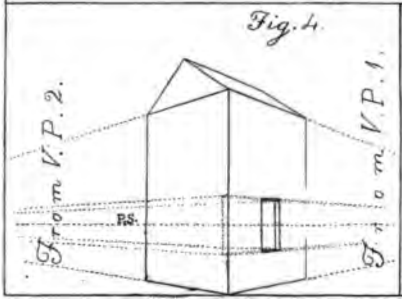

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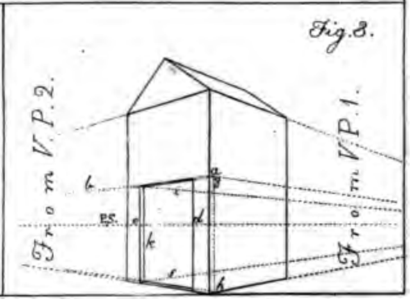

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